PROJECT MANUAL

FOR

SIDING, WATERPROOFING, AND

ROOFING REPLACEMENT

AT

MARYLAND ARCHAELOGOGICAL

CONSERVATION LABORATORY (MAC-Lab)

AT

JEFFERSON PATTERSON PARK & MUSEUM (JPPM)

10515 MACKALL ROAD

ST. LEONARD, MD 20685

FOR THE

MARYLAND DEPARTMENT OF PLANNING

DGS PROJECT NO. HT-000-180-001 RE-BID

DATE: July 9, 2019

Project Cost Classification "D"

"Minority Business Enterprises are Encouraged

to Respond to this Solicitation Notice"

STATE OF MARYLAND

Department of General Services

Ellington E. Churchill, Jr., Secretary

301 West Preston Street

Baltimore Md. 21201

Board of Public Works

Larry Hogan, Governor

Peter Franc hot, Comptroller

Nancy K. Kopp, Treasurer

DGS PROJECT NO. HT-000-180-001

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DIVISION 1 – GENERAL REQUIREMENTS

A. Scope of Work:

The successful contractor shall provide all labor, equipment, tools, materials, insurance, supplies, etc. required for replacing siding, waterproofing, and roofing at Maryland Archaeological Conservation Laboratory (MAC-Lab) located at 10515 Mackall Road, Saint Leonard, Maryland 20685 on the grounds of the Jefferson Patterson Park and Museum (JPPM),.

B. Description of Work:

1. The Contractor is strongly urged to visit the site and familiarize themselves with the conditions under which the work will be performed. No allowance will be made for any errors on the Contractor's part for failure to take into account any conditions or circumstances existing on the site which may affect the contemplated work. All measurement are estimates and the contractor is responsible for taking their own. The fact that a bid is submitted will be taken as evidence that the Contractor has a full knowledge of the extent and character of the work and the problems in performing it.
2. The Contractor shall maintain the work site in a safe, neat, orderly manner throughout the entire project and take steps to prevent accumulation of debris at the job site. The Contractor shall be responsible for the removal and disposal of all debris throughout the duration of the project.
3. The Contractor shall take the appropriate steps to insure a watertight system throughout the entire project. Any water damage resulting from this project shall be repaired or replaced by the Contractor at no additional cost to the State.
4. Where applicable all materials and supplies shall be installed in accordance with the manufacturers written instructions as if specified herein.
5. All material and work shall be installed and completed in a first class manner. Any materials or equipment installed which does not present an orderly and reasonably neat workmanlike appearance and operation shall be removed and replaced when so directed by DGS or their designee at the Contractor's expense.
6. The Contractor shall perform all cutting and patching necessary for the installations of the new work. Patching shall be uniform in appearance and shall match the surrounding surface to the satisfaction of DGS or their designee.
7. When the work specified hereunder connects to any existing work, the Contractor shall perform all necessary alterations, cutting, fitting, etc., of the existing work as may be necessary or required to make satisfactory connections between new and existing work, and shall leave the completed work in a finished and workmanlike condition and operation to the satisfaction of DGS Construction Inspector or their designee.
8. The contractor shall complete all work within **270 calendar days** upon receiving the Notice To Proceed from DGS Construction Inspector. **Liquidated damages in the amount of $750 per day apply to this contract.**
9. Contractor is responsible to ensure weather conditions are suitable for all applications per the manufacturer's guidelines.
10. If defects are noted while performing the work or during diagnosis and/or start and operational checks, the contractor shall provide a detailed report within seven calendar days of the service day indicating what components require further work and/or replacement, any recommendations, and costs. Additional services are subject to prior approval, and may or may not be completed on the day of service. The Contractor shall notify the DGS Construction Inspector of any situation that may develop which prevents the proper installation of the work as specified before proceeding.
11. The building(s) will be occupied during all phases of this project. The contractor shall plan and execute all work in such a manner as to reduce interference with the normal function of the building(s). The contractor shall plan and execute all work to ensure that, as is feasibly possible, there is no interruption in the utilities servicing the building(s). The contractor shall schedule any interruptions in advance with JPPM staff and DGS designee.

12. The contractor shall provide adequate protection where required for the existing building(s), contents of same, and all building occupants.
13. The contractor shall take particular care to prevent damage to any grounds, buildings or other structures. The contractor shall be responsible for repairs necessary to return any damaged areas back to its original condition before any damage occurred.
14. The contractor shall keep all driveways and walkways clear of materials, debris, etc. at all times so there will be no interference with the usual traffic serving the building(s).
15. The contractor shall ensure that emergency vehicles have free and clear access to all points on the property.

C. MATERIALS

1. All materials and methods of application are to be submitted for review and approval by the Using Agency and DGS prior to material order placement or work beginning. Contractor responsible for providing all submittals with a cover sheet describing the product or method being submitted for consideration. DGS and the Using Agency shall provide response on all submittals within 7 (seven) business days from date of receipt.
2. Product Data: Provide data for each type of product indicated in this section or required by the manufacturer to complete the work. Indicate material characteristics, performance criteria and limitations.
3. MSDS Sheets: Provide Material Safety Data Sheets for all products to be used on the project.
4. It shall be the contractor's responsibility to field-verify all existing conditions and dimensions prior to submitting bid proposal and ordering materials.
5. All materials shall be delivered to the site in its original, unopened packaging. It will be the contractor's responsibility to provide adequate, manufacturer's approved storage on site. Onsite storage area to be coordinated with JPPM staff.
6. The Contractor shall provide, as if specified herein, any materials and supplies not specifically mentioned but reasonably implied for the complete, safe, and satisfactory completion of the project.
7. Asbestos containing material is prohibited. An asbestos containing material is defined as a material that contains one percent or more of asbestos by weight. The contractor shall supply paperwork that indicates the composition of materials used (i.e. suppliers and/or manufacturer's legal statement or certification and Safety Data Sheet). The contractor is responsible for the replacement of any asbestos containing material they install at no cost to the State.
8. All materials are to be used for their intended purpose and per the manufacturer's guidelines.
9. Contractor to apply materials and additional coats per manufacturer's directions to ensure the finished product will withstand exterior elements.

D. Qualifications of the Contractor:

1. The Contractor shall have a minimum of 5 (five) years of experience performing construction of a similar nature. Contractor shall provide references and/or referrals for similar projects upon request.
2. Engage experienced technicians who have completed similar work using similar material and to the same extent as the work required for this project that has resulted in a record of successful in-service performance.
3. The contractor is responsible for any work subcontracted to others. It is the contractor's responsibility to ensure that any subcontractor hired adheres to the specifications and contract terms and conditions. The contractor shall supply the DGS Construction Inspector or their designee the list of subcontractors the contractor intends to utilize prior to any work commencing.
4. The contractor shall complete all work in a first class manner. Any work that does not present an orderly and reasonably neat workmanlike appearance shall be redone when so directed by the DGS Construction Inspector or their designee at the contractor's expense.
5. The Contractor shall, at his own expense, procure all necessary permits, certificates, and licenses required by law for the execution of the work. All inspections shall be conducted by the State of Maryland authorized inspection agencies.

6. The Contractor must comply with all requirements of Annotated Code of Maryland, Business Regulation Article, Title 9A (latest revisions and supplements), Code of Maryland Regulations (COMAR) 09.15 (latest revisions and supplements), any and all bulletins, policies, directives, etc. issued by the Maryland Department of Labor, Licensing, and Regulations (DLLR) (latest edition). Additionally, the contractor must comply with the latest editions of applicable codes, regulations, standards, and laws in performing this work (for example; COMAR, the National Electric Code, International Building Code, International Mechanical Code, International Plumbing Code, etc.). Violations shall be removed and replaced when so directed by the DGS Construction Inspector, or their designee, at the Contractor's expense.
7. The Contractor or subcontractor must be licensed in Maryland to perform this type of work, as required. The Contractor and subcontractors under the contract must comply with minimum insurance requirements established under COMAR Title 9A-402 (latest revision).

E. <u>Site Conditions:</u>

1. All work shall be completed during a normal work day. A normal work day is defined as Monday through Friday, 7:30am-4:00pm, with the exception of Maryland State Holidays. The contractor may make mutually agreeable arrangements with the Executive Director of JPPM or their designee to come in earlier, later, or on non-working days without extra cost to the State.
2. Any work that will interfere with the normal use of the building or area in any manner shall be done at such a time or times as shall be mutually agreed upon between the Contractor and the Executive Director of JPPM or their designee.
3. The contractor shall protect existing utilities. The Contractor shall verify the location of all existing utilities and be responsible for their protection and any and all relocations as required to complete the project.
4. Coordination of trades; it is essential that the Contractor coordinate his work with any other trades prior to actual installation of equipment, etc. Also, the Contractor shall take particular care to coordinate his work with that of any other contractor(s) working on the premises.
5. The contractor shall ensure any equipment and material utilized to access various portions of the buildings or installed equipment does not damage the building or installed equipment. The contractor is responsible for the repair of any damages they incur. Repairs shall be uniform in appearance and operations to the satisfaction of the Executive DGS or their designee.
6. When any work that would result in the disturbance of soil is involved, the contractor shall notify the Executive Director of JPPM or their designee. The soil disturbance shall be scheduled so an archeologist from JPPM can approve of and/or be present during the soil disturbance.
7. Contractor may use the electric, water and bathroom facilities at the facility. This accommodation however, may be removed at any time if it is deemed that anyone under the control of the contractor is not respecting the property of JPPM or the personnel working there.
8. The contractor shall leave no area unsecured or unsafe at end of the day.
9. All construction debris shall be removed on a daily basis. At the end of each workday, remove empty cans, rags, rubbish, and other discarded construction materials from the site. Hallways, walkways, driveways, and indoor/outdoor living areas shall be kept broom clean at all times. The work site shall be left in an orderly and clean manner.
10. Upon completion of this work, the job site shall be left in as good or better condition as it was found before the commencement of the work. At the completion of the project the Contractor shall immediately remove all of his equipment and construction debris from the project site. All defective parts shall be removed by the contractor and properly disposed of offsite unless otherwise stated herein.

F. <u>Safety:</u>

1. The contractor shall erect proper barricades such as safety fencing and post appropriate signs. The contractor shall monitor the areas while performing work to ensure safety of all users and employees of JPPM.

2. Contractor shall strictly adhere to the Maryland Occupational Safety and Health (MOSH) and U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) rules and regulations as they apply to this project.

G. Warranty:

1. **The Contractor shall warrant their work for a period of 2 years from the date of Substantial Completion** as established by the Using Agency and DGS, per Section 7.14 of DGS General Conditions for Construction Contracts. Contractor to provide the Using agency and DGS with any manufacturer warranty information and any manufacturer warranty shall pass thru to the Using Agency. Any issues identified that are related to any work performed as part of this contract during the **2 year period** will be reworked by the Contractor at no additional cost to the State of Maryland.
2. The Contractor shall provide to the DGS Construction Inspector all warranties, owner's manuals, operating information, MSDS, etc., for the equipment and materials used on this project. All information shall be neatly compiled in a binder and Contractor shall provide 2 copies to the DGS Project Manager, for review and approval, prior to the Substantial Completion meeting.

H. Basis of Award:

1. Pricing:
   a) Line Item #1 - Base Bid - Shall consist of all labor, equipment, material, etc. necessary for the removal of existing siding and installation of new concrete composition siding, trim boards, etc. on the identified buildings; as per above specifications and drawings.

2. This contract will be awarded to the responsible bidder who submits the lowest responsive evaluated total bid. The contractor shall provide pricing as indicated above.

END OF DIVISION 1

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Removal and disposal of existing wood siding, wood trim, underlayment and insulation board down to existing wood furring on concrete, CMU and wood framed building walls.
2. Removal and disposal of existing stucco system at grade.
3. Removal and disposal of existing wood louvers.
4. Removal and storage of existing gravel and soil as required to expose foundation waterproofing system. Suitable materials may be reinstalled.
5. Removal and disposal of insulation board, drainage/protection board and self-adhered sheet membrane waterproofing down to existing concrete and CMU foundation walls.
6. Removal and disposal of existing metal roofing, underlayment and nailable insulation board down to existing steel and wood roof decks.
7. Removal and disposal of two (2) rooftop mechanical units and one (1) hot flue where directed by Owner.

B. Related Sections:

1. Section 07 1413/RUBBERIZED ASPHALT WATERPROOFING for installation of new foundation waterproofing.
2. Section 07 4113/MANUFACTURED ROOF PANELS for installation of new metal roofing.
3. Section 07 4600/SIDING for installation of new cement board siding.
4. Section 07 6200/FLASHING AND SHEET METAL for installation of sheet metal flashings integral with waterproofing, roofing and siding.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property. Indicate proposed locations and construction of barriers.

B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's, building manager's and other tenants' on-site operations are uninterrupted.
2. Use of elevator and stairs.
3. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

C. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.

D. Predemolition Photographs or Video: Submit before Work begins.

E. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 JOB CONDITIONS

A. Coordination: Coordinate dumpster location/access and vehicle access with Owner's Site Representative. Verify locations of underground storage tanks, if any, with Owner's Representative prior to driving on lawn areas.

B. Occupancy: The buildings will be occupied during selective demolition. The foreman must coordinate with Owner before starting demolition work. Conduct selective demolition work in manner that will not disrupt normal operations. Provide minimum of 72 hours advance notice to Owner's Site Representative of demolition activities that will affect normal operations. Coordinate with on-site personnel regarding work shut down due to scheduled activities at the site.

C. Staging Area: Staging area will be determined prior to construction. Coordinate specific location with Owner's site representative.

D. Restroom Facilities: Contractor will not have access to the Building's restroom facilities and should provide their own temporary facility. Coordinate location with Owner's site representative.

E. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.

F. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed. Storage or sale of removed items on site will not be permitted.

G. Protections: Provide temporary barricades and other forms of protection to protect general public from injury due to selective demolition work.

1. Provide protective measures as required to provide free and safe passage of pedestrians to occupied portions of building.
2. Erect temporary covered passageways as required by authorities having jurisdiction.
3. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
4. Provide temporary weather protection during interval between demolition and removal of existing construction and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
5. Provide temporary protection to prevent dust migration into the building regardless of building and site conditions.
6. Remove protections at completion of work.

H. Damages: Promptly repair damages caused to adjacent facilities by demolition work.

I. Utility Services: Maintain existing utilities in service and protect them against damage during demolition operations.

1. Schedule with Owner any temporary interruption of utilities. Temporarily disconnect power as required for demolition work. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities. After roofing/flashing installation, reconnect power matching existing conditions.
2. Maintain fire protection services during selective demolition operations.

1.8 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

1.9 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties (if any). Notify warrantor before proceeding.

B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

D. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

E. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs, and/or preconstruction videotapes.

1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
2. Undocumented items discovered to be damaged after the Work has begun must be repaired or replaced at no cost to the Owner.

3.2 PREPARATION

A. Water test: Prior to any demolition, water test all roof drains, storm drain lines, downspouts and catch basins with a 3/4 inch diameter garden hose flowing at maximum capacity, about 5 gallons per minute. Report all blockages to Owner's Representative. All blocked storm drains or downspouts discovered after demolition has begun, including brooming of gravel, will be cleaned out and made free draining (> 5 gallons per minute) at Contractor's expense.

B. Cease operations and notify Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.

C. Cover and protect furniture, equipment, and fixtures from soilage or damage when demolition work is performed in areas where such items have not been removed.

D. Erect and maintain dust-proof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building. At a minimum, install these protections at the building exterior to protect openings. Install additional protection at other locations and at interior of openings as required to eliminate dust migration. Inspect and repair or replace damaged or missing protections before beginning work each day.

E. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

3.3 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of

hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.

5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.4 SELECTIVE DEMOLITION PROCEDURES

A. Remove and discard existing wood siding, wood trim, sheet metal flashing and trim, underlayment and insulation board down to the existing wood furring strips against the surface of the existing concrete, CMU and wood framed building walls. Completely remove fasteners and other items that may interfere with installation of new siding system. Remove and discard deteriorated or untreated wood furring strips and wood sheathing at wood framed walls.

B. Remove and discard existing stucco system at grade. Existing stucco typically extends from the bottom of the wood siding to below grade. Remove metal lath, fasteners and other items that may interfere with installation of new EIFS or waterproofing systems.

C. Remove and discard existing wood louvers at all locations in preparation of new aluminum louver installation.

D. Excavate, remove and store existing soil, gravel and drain lines adjacent to foundation walls for reuse after installation of new waterproofing system. Store suitable soil and gravel in piles for backfilling, and remove from site all unsuitable material. Install protection in excavations until they are backfilled.

E. Remove and discard existing insulation board, drainage/protection board and self-adhered sheet membrane waterproofing down to the surface of the existing concrete and CMU foundation walls. Remove all loose/spalled concrete in preparation of repairs prior to installing new waterproofing system.

F. Remove and discard existing standing seam metal roofing, sheet metal flashing and trim, underlayment and nailable insulation board down to the surface of the existing steel and wood roof decks. Completely remove fasteners and other items that may interfere with installation of new roofing system.

G. Remove and discard two (2) existing rooftop mechanical units. Cap utilities to these units below the roof level and patch roof deck prior to installing new roofing system.

H. Remove all existing wood nailers as required to install new wood nailers to the configurations shown on the Drawings. Do NOT remove existing wood nailers indicated to remain.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Rubberized-asphalt waterproofing membrane, reinforced.
2. Insulation.

B. Related Sections:

1. Section 02 4119/SELECTIVE DEMOLITION for removal and disposal of existing materials.
2. Section 07 4113/MANUFACTURED ROOF PANELS for installation of new metal roofing.
3. Section 07 4600/SIDING for installation of new cement board siding.
4. Section 07 6200/FLASHING AND SHEET METAL for installation of sheet metal flashings integral with waterproofing, roofing and siding.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.

B. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins to adjoining waterproofing, and other termination conditions.

C. Samples: For the following products in manufacturer's standard sizes unless otherwise indicated:

1. Flashing sheet.
2. Membrane-reinforcing fabric.
3. Insulation.

D. Qualification Data: For qualified Installer.

E. Product Test Reports: For waterproofing, based on evaluation of comprehensive tests performed by a qualified testing agency.

F. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A firm that is approved or licensed by manufacturer for installation of waterproofing required for this Project and is eligible to receive special warranties specified.

B. Source Limitations: Obtain waterproofing materials sheet flashings, protection course, molded-sheet drainage panels and insulation from single source from single manufacturer.

C. Mockups: Install waterproofing to 100 sq. ft. of wall to demonstrate surface preparation, crack and joint treatment, corner treatment, thickness, texture, and execution quality.

1. If Engineer determines mockups do not comply with requirements, reapply waterproofing until mockups are approved.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Engineer specifically approves such deviations in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at Project site.

1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.5 UNIT PRICE REPAIRS

A. Unit prices are required for specific repair items to provide for the addition or deleting of work; if either become necessary during the course of the contract or if the Engineer's estimated quantities vary more than +10 percent from the actual work required. Complete the Unit Price Schedule included in this contract and return with the Bid. The Contractor will be paid for the actual amount of unit price work completed as shown on approved "as-built" drawings.

1. At each location where unit price repairs are performed, record the location and type of each repair to be performed on a roof plan and spreadsheet. Submit unit price documentation with each invoice and provide both the Owner and Engineer with a copy. Engineer will review the submitted quantities and the approved quantities shall be used for Contractor payment.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by waterproofing manufacturer.

B. Remove and replace liquid materials that cannot be applied within their stated shelf life.

C. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Proceed with waterproofing work only when existing and forecasted weather conditions will permit work to be performed according to this specification, the manufacturer's specifications, recommendations, and warranty requirements. Do not subject occupied spaces to water damage. Coordinate work schedule with the Owner's Representative.

1. Apply waterproofing within the range of ambient and substrate temperatures recommended by manufacturer. Do not apply waterproofing when temperature is below 0 deg F.
2. Do not apply waterproofing to a damp or wet substrate or in snow, rain, fog, or mist.

B. Maintain adequate ventilation during application and curing of waterproofing materials.

C. Field Measurements: Prior to ordering materials, the Contractor shall field measure all dimensions to determine sizes/quantities. Contractor must field verify all detail dimensions prior to fabricating metal flashings.

D. Place tarps and plywood under kettle and provide positive retaining barricades around kettle.

E. Protect adjacent building surfaces from spilling and splattering of waterproofing materials. Clean all spilled and splattered materials at once.

F. Protections: Provide temporary barricades and other forms of protection to protect general public from injury and damage to property due to selective demolition work and waterproofing installation.

1.8 SPECIAL CONDITIONS

A. The Contractor is responsible for conducting work so normal routines, activities and procedures at the building are not disturbed. Coordinate work with the Owner's Site Representative.

B. The Contractor must have a foreman, who is fluent in English, on the site whenever any Contractor or Sub-Contractor employee is at the site. The foreman must check-in with the Owners Representative each morning and inform them where roofing operations will take place.

C. The Owner's Site Representative shall have the power to order the permanent removal from the premises any employee of the Contractor for incompetency. Furthermore, the Owner's Site Representative shall have the power to stop work if the Representative believes the work is not progressing in accordance with the Contract Documents or membrane manufacturer's specifications. The Contractor shall immediately comply with this order.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace waterproofing and sheet flashings that do not comply with requirements or that fail to remain watertight within specified warranty period.

1. Warranty insulation will retain 80 percent of original published thermal value.
2. Warranty Period: 10 years from date of Substantial Completion.

B. Special Installer's Warranty: Specified form signed by Installer, covering Work of this Section, for warranty period of 5 years.

1. Warranty includes removing and reinstalling backfill, protection board, drainage panels, and insulation.

PART 2 - PRODUCTS

2.1 WATERPROOFING MEMBRANE

A. Hot Fluid-Applied, Rubberized-Asphalt Waterproofing Membrane: Single component; 100 percent solids; hot fluid-applied, rubberized asphalt.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product by the following:

a. Henry Company; 790-11.

2.2 FLASHING SHEET MATERIALS

A. Elastomeric Flashing Sheet: 50-mil- minimum, uncured sheet neoprene as follows:

1. Tensile Strength: 1400 psi minimum; ASTM D 412, Die C.
2. Elongation: 300 percent minimum; ASTM D 412.
3. Tear Resistance: 125 psi minimum; ASTM D 624, Die C.
4. Brittleness: Does not break at minus 30 deg F; ASTM D 2137.

2.3 AUXILIARY MATERIALS

A. Backer Rod: Closed cell polyethylene foam rod or rope, 25 percent greater in diameter than joint width to be sealed. Do not puncture rod.

B. Bond Breaker: Polyethylene tape, adhesive strength 35 oz/in width, tensile strength 20 lbs/in width, 14 mils thick.

C. Bonding Agent (concrete patching): Three component epoxy resin/portland cement coating (Sika Armatec 110 by Sika).

D. Brushes (cleaning for concrete patching): Natural fiber bristle only.

E. Cleaning Solution (Job-Mixed for concrete patching): Solution prepared by mixing 3 oz. of trisodium phosphate (TSP), 1 oz. of laundry detergent (Tide, All, etc.), 1 quart of 5 percent sodium hypochlorite (bleach), and 3 quarts of warm water for each gallon of solution required.

F. Concrete patching material (edge/overhead/vertical): Two component, high early strength, polymer-modified, portland cement patching material with corrosion inhibitors (SikaTop 123 Plus by Sika).

G. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel termination bars; approximately 1 by 1/8 inch thick.

H. Nailins: Fed Spec FF-S-325, Group V, Type 2, Class 3; zinc alloy body, 1/4 inch diameter; stainless steel pin. Length sufficient to penetrate substrate 1 1/2 inches minimum (Zamac Nailins by Powers). Predrill holes before installing fastener.

I. Primer: ASTM D 41, asphaltic primer.

J. Protection Course: ASTM D 6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:

1. Thickness: 1/8 inch, nominal, for vertical applications; 1/4 inch, nominal, elsewhere.

K. Reinforcing Fabric: Manufacturer's recommended, spun-bonded polyester fabric.

L. Sealants and Accessories (for waterproofing): Manufacturer's recommended sealants and accessories.

M. Sealant (polyurethane): ASTM C 920, Grade NS, Class 25, two (Type M) part polyurethane, non-sag, sealant (Sikaflex 2c by Sika; ChemCalk 2641 by Bostik; Dynatrol II by Pecora; Sonolastic NP2 by Sonneborn; Dymeric 240 by Tremco). (Note: a one part sealant will not be permitted!) Colors to be selected by Owner from Manufacturer's color charts with full range of stock colors.

N. Self Adhering Sheet Membrane: Self adhering membrane composed of a high strength, embossed, slip resistant polyethylene film coated on opposite side with a layer of butyl rubber adhesive, and formed into flexible sheets, 30 mils minimum thickness, designed for use under metal roofing and flashings and elevated temperatures (Ultra by W.R. Grace and Co.). Use primers, mastics and liquid membrane supplied by membrane manufacturer

2.4 INSULATION

A. Board Insulation: Extruded-polystyrene board insulation complying with ASTM C 578, Type VI, 40-psi minimum compressive strength; unfaced; fabricated with shiplap or channel edges and with one side having grooved drainage channels.

1. Subject to compliance with requirements, provide the product by one of the following (as required by waterproofing manufacturer):

a. Dow Chemical.
b. Owens Corning.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
2. Verify that substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263 -(MANDATORY). If concrete is too wet for membrane installation, notify Engineer and manufacturer's representative. Install temporary weatherproofing and repeat test the day following sustained sunshine or until conditions are acceptable to manufacturer's representative.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Cover air-intake louvers before proceeding with waterproofing work that could affect indoor air quality. At some facilities air intakes may not be shut down. At these locations utilize manufacturers recommended masking agent.

B. Clean and prepare substrate according to manufacturer's written recommendations. Provide clean, dust-free, and dry substrate for waterproofing application. Use scarifiers, scrabblers, grinders or other mechanical methods (abrasive blast cleaning devices) to remove bitumen from surface to satisfaction of membrane manufacturer AND Engineer. Please note that Engineer's requirements may be more stringent than the manufacturer's requirements. The finished surface shall be free of felts and bitumen build-up; only a semi-transparent bitumen/primer haze should remain.

C. Mask off adjoining surfaces not receiving waterproofing to prevent spillage from affecting other construction.

D. Remove grease, oil, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

E. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, and other voids.

3.3 CONCRETE REPAIRS

A. Demolish deteriorated concrete using 15 to 30-pound pneumatic chipping hammers equipped with chisel points (assume patch depths average 4 inches). Remove all deteriorated concrete to "sound" concrete. "Sound" is defined as an area free of delaminations, spalling, patches and compressive strength equaling the original strength. Carefully saw cut the perimeter of the concrete patch area ½ inch deep to provide smooth, neat and keyed bonding surface.

B. Remove deteriorated and spalled concrete. After the perimeter of the repair area is sawcut to a minimum depth of ½ inch, remove loose, deteriorated concrete in damaged area.

C. Notify Engineer at least 48 hours prior to the completion of demolition in each phase, so the demolition work and existing steel reinforcing can be inspected and evaluated prior to patching. Additional reinforcement will be required where existing reinforcing steel has lost more than 15 percent of original cross sectional area, as determined by Engineer.

D. Install forms (where required), apply a bonding agent and install concrete patching material in accordance with Manufacturer's specifications and recommendations until patch surface matches adjacent surface of structural concrete.

E. Finish with a steel trowel until smooth and level with surrounding surface. Where forms cannot be used, trowel on concrete patching material in accordance with Manufacturer's specifications.

F. Maintain lines, edges and corners. Grind high points smooth with adjacent surfaces. Form or tool a drip edge. Wet cure concrete by covering with clean, wet burlap in accordance with Manufacturer's specifications and recommendations. Keep burlap moist so that a film of moisture remains continuously in contact with the concrete throughout the curing period. Cover burlap with polyethylene when Contractor is offsite for extended periods of time (overnight).

G. When applicable, follow the American Concrete Institution's recommendations concerning cool weather or hot weather concrete installation.

H. Remove and replace areas that experience shrinkage cracking at no additional cost to the Owner. After 7 days of curing, sound patch with a hammer in presence of Engineer. Remove and replace hollow sounding or defective patches.

I. Grind patch edges and exposed surfaces flush with adjacent surfaces. After concrete has cured 14 days or as required by coating manufacturer, apply concrete coating materials to balcony surfaces as specified in other paragraphs of this specification.

J. R1C: Provide a price per square foot (Contractor credited for a minimum of 1 square foot at each location) to repair deteriorated concrete on foundation walls (assume average depth equals 4 inches). The Contractor shall sound, locate and repair all deteriorated concrete and be

reimbursed in accordance with the Unit Price Schedule. Before performing work, complete the quantity survey and provide marked-up Drawings indicating the location of concrete repairs for each Tier as stated in SPECIAL CONDITIONS - QUANTITY SURVEY paragraph. Also, when submitting payment requests, provide marked-up Drawings indicating completed work to be reimbursed on a Unit Price basis.

K. R2C: Provide a price per linear foot (Contractor credited for a minimum of 1 linear foot at each location) to repair cracks larger than 1/4 inch wide. Repair cracks by routing the crack to a minimum 1/4 inch deep, installing a bond breaker tape (depth less than 3/8 inch) or backer rod (depth greater than 3/8 inch) and installing sealant. Comply with the sealant Manufacturer's recommended sealant joint width-to-depth ratios.

L. Treat other, smaller cracks in accordance with "Joints, Cracks, and Termination" paragraph below.

3.4 JOINTS, CRACKS, AND TERMINATIONS

A. Prepare and treat substrates to receive waterproofing membrane, including joints and cracks, corners, and penetrations according to manufacturer's written instructions.

1. Rout and fill joints and cracks in substrate. Before filling, remove dust and dirt according to ASTM D 4258.
2. Adhere strip of elastomeric sheet to substrate in a layer of hot rubberized asphalt. Extend elastomeric sheet a minimum of 6 inches on each side of moving joints and cracks or joints and cracks exceeding 1/8 inch thick, and beyond penetrations. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet
3. Embed strip of reinforcing fabric into a layer of hot rubberized asphalt. Extend reinforcing fabric a minimum of 6 inches on each side of nonmoving joints and cracks not exceeding 1/8 inch thick, and beyond roof drains and penetrations.

B. At expansion joints and discontinuous deck-to-wall or deck-to-deck joints, bridge joints with elastomeric sheet extended a minimum of 6 inches on each side of joints and adhere to substrates in a layer of hot rubberized asphalt. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.

3.5 FLASHING INSTALLATION

A. Install elastomeric flashing sheets at corners (inside and outside) of waterproofing membrane as shown on Drawing and in according to manufacturer's written instructions.

B. Prime substrate with asphalt primer.

C. Adhere elastomeric flashing sheet to deck and wall substrates in a layer of hot rubberized asphalt.

3.6 MEMBRANE APPLICATION

A. Apply primer, at manufacturer's recommended rate, over prepared substrate and allow to dry.

B. Heat and apply rubberized asphalt according to manufacturer's written instructions.

1. Heat rubberized asphalt in an oil- or air-jacketed melter with mechanical agitator specifically designed for heating rubberized asphalt

C. Start application with manufacturer's authorized representative present.

D. Reinforced Membrane: Apply hot rubberized asphalt to substrates and adjoining surfaces indicated. Spread to a thickness of 125 mils; embed reinforcing fabric, overlapping sheets 2 inches; spread another 125-mil- thick layer to provide a uniform, reinforced, seamless membrane 250 mils thick.

E. Apply waterproofing over prepared joints and up wall to heights indicated or required by manufacturer.

F. Cover waterproofing with protection course with overlapped joints before membrane is subject to backfilling.

G. Install a hot-applied fabric reinforced rubberized asphalt membrane using the current edition of manufacturer's specifications and installation instructions, which are mandatory in this work, and the following requirements:

1. Keep two thermometers on site at all times, one at the kettle and one at point of application.
2. Use double jacketed, oil bath or hot air kettle with mechanical agitation specially designed for hot-applied, rubberized asphalt materials. Maintain oil at 500°F. Apply rubberized asphalt at 375-400°F.
3. Site kettle downwind from air intakes and windows. Move kettle away from air intakes and windows if requested by the Owners Representative.
4. Follow manufacturer's specifications for installation of flashing and reinforcement at cracks and joints in concrete.
5. At joints and cracks in concrete, set manufacturer's recommended neoprene membrane in a layer of hot asphalt extending a minimum of four inches from each edge of the joint.
6. Prior to installing membrane, apply manufacturer's recommended primer.
7. Apply hot, rubberized asphalt to area to receive roofing. Spread a 125-mil- thick layer of hot, rubberized asphalt; embed reinforcing fabric, overlapping sheets 2 inches; and

spread another 125-mil- thick layer of hot, rubberized asphalt to form a uniform, reinforced, seamless membrane, 250 mils thick.

8. Cover membrane with separator/protection course with overlapped joints while rubberized asphalt is still hot and before installing backfill.
9. Lay out grids to ensure rubberized asphalt is installed at specified thickness.
10. Set uncured neoprene flashing in hot-applied rubberized asphalt wherever possible; otherwise, set in bonding adhesive. Roll all sheet membrane and seams with a heavy hand roller immediately after section of membrane is installed, to ensure complete bonding to substrate.
11. At top termination of waterproofing, install termination bar and secure with nailins (masonry/concrete), 6 inches on center.
12. Provide watertight temporary tie-ins where new waterproofing meets existing at the end of every day, or if rain is expected. NOTE: This is an absolutely essential requirement.

3.7 INSULATION INSTALLATION

A. Install one or more layers of board insulation to achieve required thickness over waterproofed surfaces. Cut and fit to within 3/4 inch of projections and penetrations.

B. On vertical surfaces, set insulation units into rubberized asphalt according to manufacturer's written instructions.

3.8 FIELD QUALITY CONTROL

A. Owner may engage Engineer to observe and inspect waterproofing installation.

B. Remove and replace applications of waterproofing where inspections indicate that they do not comply with specified requirements.

C. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 CLEANING AND PROTECTION

A. Protect waterproofing from damage and wear during remainder of construction period.

B. Protect installed board insulation from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

C. Oean spillage and soiling from adjacent construction using cleaning agents and procedures **recommended by manufacturer of affected construction.**

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Standing-seam roof panels for exterior applications.
2. Standing-seam roof panels for interior applications.
3. Flush wall panels installed integral with roofing.
4. Screen wall interlocking panels.
5. Soffit.

B. Related Sections:

1. Section 02 4119/SELECTIVE DEMOLITION for removal and disposal of existing materials.
2. Section 07 1413/RUBBERIZED ASPHALT WATERPROOFING for installation of new foundation waterproofing.
3. Section 07 4600/SIDING for installation of new cement board siding.
4. Section 07 6200/FLASHING AND SHEET METAL for installation of sheet metal flashings integral with waterproofing, roofing and siding.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide manufactured roof and wall panel assemblies complying with performance requirements indicated and capable of withstanding structural movement, thermally induced movement, and exposure to weather without failure or infiltration of water into the building interior.

B. Air Infiltration: Provide manufactured roof and wall panel assemblies with permanent resistance to air leakage through assembly of not more than 0.066 cfm/sq. ft.of fixed roof area when tested according to ASTM E 1680 at a static-air-pressure difference of 6.24 lbf/sq. ft.

C. Water Penetration: Provide manufactured roof and wall panel assemblies with no water penetration as defined in the test method when tested according to ASTM E 1646 at a

minimum differential pressure of 20 percent of inward acting, wind-load design pressure of not less than 6.24 lb/sq. ft. and not more than 12.0 lb/sq. ft.

D. Wind-Uplift Resistance: Provide roof and wall panel assemblies that meet requirements of UL 580 for Class 75 wind-uplift resistance.

1.4 SUBMITTALS

A. Product Data: Include manufacturer's product specifications, standard details, certified product test results, and general recommendations, as applicable to materials and finishes for each component and for total panel assemblies.

B. Shop Drawings: Show fabrication and installation layouts of metal roof and wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, snow guards, other accessories; and special details. Distinguish between factory- and field-assembled work. Provide certification stating that material and fastening requirements comply with FM Windstorm Resistance Classification 1-75. Details must be similar to details shown on Drawings and be permanently water tight without relying on sealant. Obtain Engineer's approval prior to performing detail work in the field.

C. Samples for Initial Selection: Manufacturer's color charts or chips showing the full range of colors, textures, and patterns available for roof and wall panels with factory-applied finishes.

D. Samples for Verification: Provide sample panels 12 inches long by actual panel width, in the profile, style, color, and texture indicated. Include clips, fasteners, closures, and other exposed panel accessories.

E. Maintenance Data: For metal roof and wall panels to include in maintenance manuals.

F. Warranties: Special warranties specified in this Section.

G. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

H. Product Test Reports: Indicate compliance of manufactured roof and wall panel assemblies and materials with performance and other requirements based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed metal roof and wall panel projects similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Source Limitations: Obtain each type of metal roof and wall panels through one source from a single manufacturer.

C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups for roofing system including all accessories.

a. Size and Location: 3 full panels from eave to ridge on 12:12 roof slope.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Engineer specifically approves such deviations in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at Project site. Review methods and procedures related to metal roof and wall panel assemblies including, but not limited to, the following:

1. Meet with Owner, Engineer, Owner's insurer if applicable, testing and inspecting agency representative, metal roof panel Installer, metal roof panel manufacturer's representative, deck Installer, and installers whose work interfaces with or affects metal roof and wall panels including installers of roof accessories and roof-mounted equipment.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal roof and wall panel installation, including manufacturer's written instructions.
4. Examine deck substrate conditions for compliance with requirements, including flatness and attachment to structural members.
5. Review structural loading limitations of deck during and after roofing.
6. Review flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect metal roof and wall panels.
7. Review governing regulations and requirements for insurance, certificates, and testing and inspecting if applicable.
8. Review temporary protection requirements for metal roof panel assembly during and after installation.
9. Review roof observation and repair procedures after metal roof and wall panel installation.

10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

E. Unless otherwise shown or specified, or if conflicting with manufacturer's requirements, comply with the Sheet Metal and Air Conditioning Contractors National Association' (SMACNA) "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown.

F. Verify all dimensions in field prior to ordering all materials and fabricating metal roof and wall panels and flashings.

G. Field forming of roofing panels is NOT permitted, unless specifically indicated on Drawings.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal roof and wall panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Protect strippable protective covering on metal panels from exposure to sunlight and high humidity, except to extent necessary for period of metal panel installation.

E. Protect foam-plastic insulation as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic insulation materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

B. Field Measurements: Verify location of structural members and openings in substrates by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.8 COORDINATION

A. Coordinate installation of roof penetrations.

B. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of decks, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Finish Warranty: Submit a written warranty, signed by manufacturer, covering failure of the factory-applied exterior finish on metal roof and wall panels within the specified warranty period and agreeing to repair finish or replace panels that show evidence of finish deterioration. Deterioration of finish includes, but is not limited to, color fade, chalking, cracking, peeling, and loss of film integrity.

1. Finish Warranty Period: 20 years from date of Substantial Completion.

C. Special Weathertight Warranty: Submit a written warranty executed by manufacturer agreeing to repair or replace metal roof panel assembly that fails to remain weathertight within the specified warranty period.

1. Weathertight Warranty Period: 20 years from date of Substantial Completion.
2. Wind Speed Provisions: Up to and including wind speeds of 90 miles per hour.

D. Contractor's Warranty: Submit an executed copy of the Contractor's written warranty covering workmanship failures for a period of 5 years. In the first 5 years, the Contractor shall repair all leaks within 24 hours of notification of leak.

PART 2 - PRODUCTS

2.1 METALS AND FINISHES

A. Aluminum Sheet Prepainted with Coil Coating: ASTM B 209 for alclad alloy 3003 or 3004, with temper as required to suit forming operations, prepainted by the coil-coating process and complying with the following requirements:

1. Surface: Smooth, flat, mill finish.
2. Alternative alloys include 1100; alclad 3003, 3004, 3105, 5005, and 5050; in A14, H14, H24, H32, or H34 temper.
3. Thickness: 0.032 and 0.040 inch, unless otherwise indicated.
4. Exposed Finish for Exterior Panels: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
   a. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 1402, Test Method No. 7.
      1) Color and Gloss: As selected by Owner from manufacturer's full range of choices for color and gloss.

2.2 METAL ROOF PANEL SYSTEM

A. General: Provide factory-formed metal roof and wall panels designed to be field assembled by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.

B. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels, and mechanically seaming panels together.

1. Clips: Fixed, provided by panel manufacturer.
2. Joint Type: Double folded.
3. Panel Coverage: 16 inches.
4. Panel Height: 2 inches.
5. Panel Profile: With striations.
6. Uplift Rating: UL 75.
7. Basis-of-Design Product: Subject to compliance with requirements, provide product by the following:

a. Tite-Loc Plus Panel by Petersen Aluminum.

C. Metal Panel Accessories: Provide components required for a complete metal roof and wall panel assembly including trim, fasciae, corner units, ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof and wall panels, unless otherwise indicated.

1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
2. Clips: Minimum 0.0625-inch-thick, stainless-steel panel clips designed to withstand negative-load requirements.
3. Cleats: Mechanically seamed cleats formed from minimum 0.0250-inch-thick, stainless-steel or nylon-coated aluminum sheet.
4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal roof or wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
6. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
7. Elastomeric Joint Sealant: ASTM C 920, of base polymer, type, grade, class, and use classifications required to seal joints in panel roofing and remain weathertight. Provide sealant recommended by panel manufacturer.

D. Flashing and Trim: Formed from prefinished aluminum sheet except where indicated to be stainless steel. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal roof panels.

E. Gutters (hanging): Formed from prefinished aluminum sheet. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch-long sections, sized according to SMACNA's "Architectural Sheet Metal Manual." Provide bronze, copper, or aluminum wire ball strainers at outlets. Finish gutters to match metal roof panels.

F. Gutters (built-in): Formed from stainless steel sheet. Match profile of existing built-in gutter substrates complete with end pieces, outlet tubes, and other special pieces as required. Rivet and solder all joints watertight except provide expansion joints 50 feet on center.

G. Downspouts: Formed from prefinished aluminum sheet. Fabricate in 10-foot-long sections, complete with formed elbows and offsets. Finish downspouts to match metal roof panels.

H. Snow Guards: Prefabricated, two-pipe, aluminum snow guard system designed to clamp to seams of standing seam metal roofing systems (S-5! DualGard by Metal Roof Innovations).

System shall include all clamps (specifically designed for double-locked roofing panels), brackets, pipes, collars, end caps, separate clips between seams and all fasteners. All system components shall be aluminum or stainless steel, and Kynar coated to match color selected by Owner. Consult snow guard manufacturer to provide system for 20 psf sloped roofing snow load and attachment to the specified aluminum roofing panel.

2.3 THERMAL INSULATION

A. Extruded-Polystyrene Insulation: ASTM C 578, rigid, cellular polystyrene thermal insulation board formed from a polystyrene base resin by an extrusion process using HCFCs as blowing agents; with edge drainage channels; of manufacturer, type and other requirements indicated below:

1. Products: Subject to compliance with requirements, provide the following or an approved equal (as required by roofing manufacturer):

   a. Styrofoam RoofMate Insulation by Dow Chemical.
   b. Foamular 404 by Owens Corning.

2. Type VI, 1.8-lb/cu. ft. m minimum density and 40-psi minimum compressive strength. Use two 3 inch thick layers (6 inch total) to achieve R-30 minimum.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and accessories required for a complete roof and wall panel assemblies and as recommended by panel manufacturer, unless otherwise indicated.

B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat, unless otherwise indicated. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

C. Building Paper: Minimum 5 lb/100 sq. ft., rosin sized.

D. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

E. Cement Board Sheathing: Lightweight fiber-mat reinforced cementitious backer board for exterior applications meeting ASTM C1325 (DUROCK by USG), 5/8 inch thick.

F. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads.

1. Use stainless-steel fasteners.
2. Provide exposed fasteners with heads matching color of panel by means of plastic caps or factory-applied coating.

3. Provide metal-backed neoprene washers under heads of exposed fasteners bearing on weather side of panels.
4. Locate and space exposed fasteners in true vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of neoprene washer.

G. Expansion Joint (roofing): Watertight, high-movement, weldable roof expansion joint made of PVC or TPV as recommended by vapor barrier manufacturer (RoofJoint by Emseal). Joint shall interlock with siding expansion joint at roof edges. Fasten with stainless steel termination bars.

H. Paint System (for SS): Primer and top coat recommended by manufacturer for metal surfaces. Apply primer and 2 coats of paint in accordance with Manufacturer's recommendations. Color to match prefinished roofing and wall panels.

I. Plywood: CDX, APA rated 48/24 treated plywood, marked PS 1, 1/2 or 3/4 inch thick as indicated.

J. Sealant (polyurethane): ASTM C 920, Grade NS, Class 25, two (Type M) part polyurethane, non-sag, sealant (Sikaflex 2c by Sika; ChemCalk 2641 by Bostik; Dynatrol II by Pecora; Sonolastic NP2 by Sonneborn; Dymeric 240 by Tremco). (Note: a one part sealant will not be permitted!) Colors to be selected by Owner from Manufacturer's color charts with full range of stock colors.

K. Sealant (silicone): ASTM C 920, Type S, Grade NS, Class 25, one component gun-grade, low modulus silicone sealant (790, 791 and 795 by Dow Corning). Colors to be selected by Owner from Manufacturer's color charts with full range of stock colors. Provide primer recommended by Dow.

L. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

M. Self Adhering Sheet Membrane (under metal): Self adhering membrane composed of a high strength, embossed, slip resistant polyethylene film coated on opposite side with a layer of butyl rubber adhesive, and formed into flexible sheets, 30 mils minimum thickness, designed for use under metal roofing and flashings and elevated temperatures (Ultra by W.R. Grace and Co.). Use primers, mastics and liquid membrane supplied by membrane manufacturer.

N. Stainless Steel: Type 304, ASTM A 167, stainless steel; 0.018, inches thick as shown on Drawings.

O. Vapor Barrier: Single component, fluid applied, elastomeric membrane designed to provide an air, water and vapor barrier meeting ASTM E2357 and ASTM D5590 for mold/mildew/fungus resistance (Air-Bloc 32 MR by Henry). Apply when air and substrate temperatures are 40 deg F and rising. Use Air-Bloc 16MR for application temperatures down to 20 deg F and rising. Do NOT apply either product below 20 deg F. Use self-adhered water

resistive air barrier (Blueskin SA or Blueskin Butyl Flash by Henry) and primers (Blueskin Primer or #545 Aquatac) where required by vapor barrier manufacturer for transitions and flashings.

P. Wood: Grade No. 2 Southern Pine marked AWPA C2. Pressure treat with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. After treatment, kiln-dry lumber to a maximum moisture content of 19 percent.

2.5 FABRICATION

A. General: Fabricate and finish metal roof and wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Where indicated, fabricate metal roof and wall panel joints with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will minimize noise from movements within panel assembly.

D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Stainless Steel Flashings: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
3. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal roof and wall panel manufacturer.
    a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal roof and wall panel manufacturer for application but not less than thickness of metal being secured.

2.6 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal roof supports, and other conditions affecting performance of work.

B. Examine roughing-in for components and systems penetrating metal roof and wall panels to verify actual locations of penetrations relative to seam locations before panel installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment.

B. Install flashings and other sheet metal to comply with requirements specified in Section 07 6200/FLASHING AND SHEET METAL.

C. Coordinate metal panel roofing with rain drainage work; flashing; trim; and construction of decks, parapets, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

D. Promptly remove protective film, if any, from exposed surfaces of metal panels. Strip with care to avoid damage to finish.

3.3 ROUGH CARPENTRY

A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Apply field treatment to cut surfaces of treated lumber and plywood.

C. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as required for accurate fit.

D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards. Use fasteners of appropriate type and length where not identified on Drawings. Predrill members when necessary to avoid splitting wood. Attach to substrates to support applied loading and to meet Factory Mutual Data Sheet 1-49.

E. Rip standard size wood blocking as required to fit existing openings, to form specified conditions and to provide flush surfaces to receive roofing components. Fasten blocking as indicated on Drawings and to comply with current Building Code requirements. At a minimum, fasten wood blocking to adjacent wood blocking with nails, 12 inches on center staggered. Within 8 feet of corners, fasten 6 inches on center, staggered. Stagger fasteners in nailers that exceed 5 inches in width. Secure blocking with screws where shown on Drawings. All fastening conditions must comply with Factory Mutual Data Sheet 1-49.

F. Cover wood blocking with self-adhering sheet membrane immediately after installing blocking where shown on Drawings.

3.4 SHEATHING AND VAPOR BARRIER INSTALLATION

A. Patch holes in roof deck with matching roof decking or sheet metal prior to installing new sheathing. Base Bid work includes patching deck at one hot flue and two rooftop units to be removed by Owner.

B. Install cement board sheathing and fasten with enough stainless steel screws to hold in place until vapor barrier, insulation and roofing panel clips can be installed. Examine sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.

C. Install vapor barrier on cement board sheathing in accordance with manufacturer's requirements. Reinforce joints and other areas with manufacturer's self-adhering sheet membrane where required.

3.5 INSULATION INSTALLATION

A. General: Comply with insulation manufacturer's instructions and recommendations for handling, installing, and anchoring insulation to substrate.

B. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

C. Install insulation with long joints of insulation in continuous straight lines with end joints staggered between rows, abutting edges and ends between boards.

D. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

E. Fasten insulation board with enough fasteners with 2 inch diameter plates to hold insulation in place until roofing panel clips can be installed.

3.6 UNDERLAYMENT INSTALLATION

A. Where indicated, install self-adhering sheet underlayment, wrinkle free, on roof sheathing under metal roof panels. Prepare surface so substrate is clean, dry and sound. Apply primer (mandatory) supplied by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply at locations indicated on Drawings, in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll entire surface of underlayment with a heavy hand roller (mandatory) to ensure good adhesion. Cover underlayment within 14 days.

1. Install self-adhering sheet membrane by Henry (Blueskin) where required in the vapor barrier system. Install self-adhering sheet membrane by Grace (Ultra) at all other locations.

B. Install flashings to cover underlayment to comply with requirements specified in Section 07 6200/FLASHING AND SHEET METAL.

3.7 GUTTER AND DOWNSPOUT INSTALLATION

A. See Section 07 6200/FLASHING AND SHEET METAL.

B. Extend self-adhering sheet membrane at eave down to cover wood fascia. Ensure that sheet metal fascia is installed and stripped in prior to installing gutter.

C. Fabricate 5 inch wide by 6 inch deep gutter as shown on Drawing. Lap joints 1 inch, rivet 2 inches on center and seal with sealant. Rivet and seal end caps watertight to gutter. Provide

gutter straps/spacers 36 inches on center. Rivet straps/spacers to front lip and top back edge of gutter.

D. Install gutter in gutter brackets spaced 36 inches on center, alternating with straps/spacers. Fastened brackets with stainless steel screws.

E. Fabricate 4 inch long gutter outlet tube with riveted and sealed joint. Set outlet tube in sealant and fasten to bottom of gutter with rivets.

F. Fabricate 3 inch by 4 inch downspout with seamed joint at concealed side. Lap outlet tube 2 inches and secure with 3 stainless steel screws (one at each side and the front). Provide elbow at roof below and discharge onto precast concrete splash block (built-up roofs only).

3.8 EXTERIOR METAL ROOF PANEL INSTALLATION, GENERAL

A. General: Provide metal roof panels of full length from eave to ridge, unless otherwise indicated or restricted by shipping limitations. Anchor metal roof panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Field cutting of metal roof panels by torch is not permitted.
2. Install panels with concealed fasteners, unless otherwise indicated.
3. Install panels over solid substrate with minimum 3:12 slope.
4. Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction. Predrill panels.
5. Provide metal closures at peaks rake edges and each side of ridge caps.
6. Flash and seal metal roof panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.
7. Locate and space fastenings in uniform vertical and horizontal alignment.
8. Install ridge caps as metal roof panel work proceeds.
9. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
10. Lap metal flashing over metal roof panels to allow moisture to run over and off the material.

B. Fasteners: Use stainless-steel fasteners.

C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying self-adhering sheet membrane, or by other permanent separation as recommended by metal roof panel manufacturer.

D. Accessories: Install components required for a complete roof panel assembly including trim, copings, fasciae, ridge closures, clips, seam covers, flashings, gutters, sealants, gaskets, fillers, closure strips, and similar items.

E. Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating, by applying self-adhering sheet membrane, or by other permanent separation as recommended by manufacturers of dissimilar metals.

F. Form and fabricate sheets, seams, strips, cleats, valleys, ridges, edge treatments, integral flashings, and other components of metal roofing to profiles, patters, and drainage arrangements shown and as required for permanent leakproof construction without relying on sealant. Flash joints and transitions as shown and as required for leakproof construction.

G. Shop fabricate materials to the greatest extent possible.

H. Field forming roofing panels is NOT permitted, unless specifically indicated on Drawings.

I. Provide for thermal expansion and contraction of the Work.

J. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not otherwise indicated, types recommended by panel manufacturer.

1. Install weatherseal under ridge cap. Flash and seal panels at eave and rake with rubber, neoprene, or other closures to exclude weather.
2. Seal panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by panel manufacturer.
3. Prepare joints and apply sealants to comply with manufacturers' requirements.

K. Standing-Seam Panel Assembly: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended by manufacturer.

1. Install clips to supports with self-tapping fasteners.
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
3. Install roofing panels in continuous runs without end laps.

L. Installation Tolerances: Shim and align panel units within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

M. Oil Canning: Roofing panels exhibiting excessive oil canning will be removed and replaced.

3.9 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal roof panel assembly including trim, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
3. Field verify all dimensions prior to fabricating sheet metal flashings. Form and fabricate flashings, cleats, and other components to profiles, patterns, and drainage arrangements shown on Drawing and as required for permanently leakproof construction. Shop fabricate materials to greatest extent possible. Custom fabricate all flashings by obtaining exact field dimensions at each location for an accurate fit.
4. Fabricate and install work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves, and avoidable tool marks considering temper and reflectivity of metal. Provide uniform, neat seams with minimum exposure of solder. All seams in TCS flashings shall be soldered watertight. Anchor all components firmly into position using cleats and concealed fasteners unless otherwise shown on the Drawing.
5. All soldering shall be done slowly with well heated coppers. Brush a liberal amount of flux into the seams. Thoroughly heat sheet to sweat solder completely through full width of seam. Use sufficient amount of solder. Solder in the flat position to the greatest extent possible. Seams soldered on slopes greater than 45 degrees shall be soldered a second time. Neutralize and remove flux residues after soldering.
6. Where metal is to be installed directly on cementitious or wood substrates, install a slip sheet of red rosin paper and a course of polyethylene underlayment.
7. Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by Manufacturer/fabricator.

C. Eave Flashings: Fabricate and install the gutter as shown on the Drawings. Then install eave flashing/cleat. Lap and seal all flashing joints. Fasten roof flange with stainless steel screws spaced 12 inches on center. Prime surfaces and install self-adhering sheet membrane to configurations shown on Drawing. Seal ends of sheet membrane with liquid membrane. Field

verify dimensions, fabricate and install metal roofing panels. Lock end of panels to cleat as shown on Drawings.

D. Ridge Flashing: Install self-adhering sheet membrane and metal roofing panels as described above. Turn up end of panels 3/4 inch as shown on Drawing. Install metal roofing z-closure supplied by roofing manufacturer between seams, set z-closure in sealant and fasten with stainless steel screws. Hook new ridge flashing over z-closures. Lap sections and cover with 4 inch wide strip of sheet membrane and 6 inch wide cover plate.

E. Head Wall Flashing: Extend sheet membrane up wall and terminate as shown on Drawing. Install metal roofing panels as described above. Install metal roofing z-closure supplied by roofing manufacturer between seams, set z-closure in sealant and fasten with stainless steel screws. Hook new head wall flashing over roofing z-closure and fasten top with stainless steel nails (wood), screws (metal) or nailins (masonry) spaced 16 inches on center. Lap sections and cover with 4 inch wide strip of and 6 inch wide cover plate. Strip in vertical flange with sheet membrane where shown on Drawing.

F. Valley Flashing: Install sheet membrane on roof sheathing as shown on Drawing. Install valley flashing and fasten each side with stainless steel screws spaced 12 inches on center, or as required by Manufacturer. Strip in sides and top of each valley section with sheet membrane, and seal ends with sealant. Install retainer/cleat as shown on Drawing and fasten with stainless steel screws spaced 12 inches on center, or as required by Manufacturer. Field verify dimensions, fabricate and install metal roofing panels. Lock end of panels to retainer/cleats as shown on Drawing.

G. Gable Flashing: Install self-adhering sheet membrane as shown on Drawing. Then install gable flashing/cleat. Lap flashing joints to shed water and fasten roof flange with stainless steel screws spaced 12 inches on center. Prime surfaces and install self-adhering sheet membrane to configurations shown on Drawing. Seal ends of sheet membrane with liquid membrane. Field verify dimensions, fabricate and install metal roofing panels. Lock end of panels to cleat and gable flashing as shown on Drawings.

H. Rake Flashing: Install self-adhering sheet membran as shown on Drawing. Then install rake flashing/cleat. Lap flashing joints to shed water and fasten roof flange with stainless steel nails spaced 12 inches on center. Prime surfaces and install sheet membrane to configurations shown on Drawing. Seal ends of sheet membrane with liquid membrane. Field verify dimensions, fabricate and install metal roofing panels. Lock end of panels to cleat and rake flashing as shown on Drawings.

I. Snow Guards: Attach snow guards to vertical ribs of standing-seam metal roof panels with clamps with set screws. Do not use fasteners that will penetrate metal roof panels. At a minimum, clamps shall be located at each roofing seam. Clips shall be located between each seam to prevent snow migration beneath the bottom bar. Always locate first row of snow guards approximately 12 inches upslope from the roof eave, or built-in gutter. Where two rows are required, locate the second row as indicated on the Drawing based on roof slope and size. Locate row of snow guards approximately 12 inches above all pitch breaks as indicated

on the Drawing. This row shall be considered the second row of snow guards where the steeper sloped roofs discharge onto the lower 3:12 roofs. Install one row of snow guards approximately 12 inches upslope of the roof eave at each side of all dormers. Install two rows of snow guards directly above all building entrances and exits as indicated on Drawing. Some 3:12 sloped roofs may only have one row of snow guards. This generally occurs where there is no upslope pitch break and where these eaves are NOT above building entrances and exits. Refer to the Drawing for locations.

3.10 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal roof panel units within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.11 FIELD QUALITY CONTROL

A. Owner may engage Engineer to observe and inspect roofing installation.

B. Remove and replace applications of metal roof panels where inspections indicate that they do not comply with specified requirements.

C. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.12 CLEANING AND PROTECTING

A. Damaged Units: Replace panels and other components of the Work that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

B. Cleaning: Remove temporary protective coverings and strippable films, if any, as soon as each panel is installed. On completion of panel installation, clean finished surfaces as recommended by panel manufacturer and maintain in a clean condition during construction.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fiber-cement siding.
2. Exterior Insulation and Finish System (EIFS).
3. Aluminum louvers.

B. Related Sections:

1. Section 02 4119/SELECTIVE DEMOLITION for removal and disposal of existing materials.
2. Section 07 1413/RUBBERIZED ASPHALT WATERPROOFING for installation of new foundation waterproofing.
3. Section 07 4113/MANUFACTURED ROOF PANELS for installation of new metal roofing.
4. Section 07 6200/FLASHING AND SHEET METAL for installation of sheet metal flashings integral with waterproofing, roofing and siding.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples for Initial Selection: For siding including related accessories.

C. Samples for Verification: For each type, color, texture, and pattern required.

1. 12-inch-long-by-actual-width Sample of siding.
2. 12-inch-long-by-actual-width Samples of trim and accessories.

D. Product Certificates: For each type of siding, from manufacturer.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fiber-cement siding.

F. Calculations: Provide stamped engineering calculations indicating fastener spacing for the following items for both Zone 4 (field) and Zone 5 (corner) for this property. Indicate Zone 5 "a" dimension based on building size and elevation.

1. Furring strips.
2. Siding.
3. Louvers.

G. Shop Drawings: Provide shop drawings showing details for installation of any item not specifically shown on the Drawings, where changes to details are proposed or where the Drawings may not be accurate. In the absence of approved shop drawings, Contractor shall install ALL details as specified, unless these details conflict with the Manufacturer's requirements. In this case, the Contractor MUST notify the Owner of any such conflicts.

H. Maintenance Data: For each type of siding and related accessories to include in maintenance manuals.

I. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

A. Labeling: Provide fiber-cement siding that is tested and labeled according to ASTM C 1186 by a qualified testing agency acceptable to authorities having jurisdiction.

B. Source Limitations: Obtain each type, color, texture, and pattern of siding, including related accessories, from single source from single manufacturer.

C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups for siding including accessories.

a. Size: 10 feet wide from grade to roof eave.
b. Include an outside or an inside corner on one end of mockup.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Engineer specifically approves such deviations in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Perform EIFS work in accordance with the Manufacturer's specification and details; ASTM's EIFS Current Practice and Future Considerations manual; Exterior Insulation Manufacturers Association's (EIMA) Guide to EIFS Construction, and these Specifications/Drawings. The more stringent of the requirements (as determined by the Engineer) listed by either ASTM's Manual, EIMA Guide, the Manufacturer's Specification or these Specifications/Drawings shall govern,

unless they conflict with Manufacturer's warranty requirements. In this case, the Contractor is responsible for notifying the Engineer of all such conflicts in writing.

E. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials in a dry, well-ventilated, weathertight place.

1.6 COORDINATION

A. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

1.7 WARRANTY

A. Siding: Standard form in which manufacturer agrees to repair or replace siding that fails in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including cracking and deforming.
b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Period: 30 years from date of Substantial Completion.

B. EIFS: Manufacturer's standard form in which manufacturer agrees to repair or replace EIFS system that fails in materials or workmanship within specified warranty period. Warranty must include EIFS attachment conditions required to resist basic wind speeds, exposure category and building height for this property.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Contractor's Warranty: Submit an executed copy of the Contractor's written warranty covering workmanship failures for a period of 5 years. In the first 5 years, the Contractor shall repair all leaks within 24 hours of notification of leak.

1.8 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish full lengths of siding including related accessories covering 400 square feet installed.

PART 2 - PRODUCTS

2.1 FIBER-CEMENT SIDING

A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product by the following:

a. HardiePlank by James Hardie.

2. Horizontal Pattern: Boards 6-1/4 wide in plain style for 5 inch exposure to match existing.

a. Texture: Smooth.

3. Factory Priming: Manufacturer's standard acrylic primer for field painting by contractor. Alternatively, Owner may select from manufacturer's standard color chart.

2.2 ACCESSORIES

A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.

1. Provide accessories (HardieTrim) made from same material as adjacent siding unless otherwise indicated.

B. Backer Rod: Closed cell polyethylene foam rod or rope, 25 percent greater in diameter than joint width to be sealed. Do not puncture rod.

C. Bond Breaker: Polyethylene tape, adhesive strength 35 oz/in width, tensile strength 20 lbs/in width, 14 mils thick.

D. Exterior Insulation Finish System (EIFS): A code approved secondary weather resistive barrier, a grooved (drainable) expanded polystyrene insulation board (2 1/2 inches thick), base coat, reinforcing mesh and finish coat with dirt and mildew resistance. (Outsulation Plus MD System by Dryvit or approved equal). Owner to select colors and textures from Manufacturer's standard charts. Please note that more than one color may be selected.

E. Expansion Joint (siding): Pre-compressed, water-based, acrylic-infused, open-cell polyurethane foam covered with a factory-applied, low-modulus silicone bellows on the outside, with adhesive on one side of joint (Seismic Colorseal by Emseal). Consult manufacturer for size of product based on size of joint to be sealed.

F. Flashing: Provide aluminum flashing complying with Section 07 6200/FLASHING AND SHEET METAL at window and door heads and where indicated.

G. Fasteners (EIFS): 1/4 inch diameter, 410 stainless steel masonry screws with minimum 2 inch diameter polypropylene plastic plate with a recessed chamber and key openings for base coat penetration (ITW Buildex Grid-Mate PB). Fastener length to penetrate substrate 1 1/2 inches. Use only mechanical fasteners and plates approved by Dryvit.

H. Fasteners (furring): Stainless steel Tapcon by ITW Buildex, ¼ inch diameter by length required to penetrate furring, insulation and into concrete 1 ½ inches minimum. Provide stamped engineering calculations indicating fastener spacing for furring located in Zone 4 (field) and Zone 5 (corner) for this property.

I. Fasteners (siding):

1. For fastening to wood, use siding nails of sufficient length to penetrate a minimum of 1 inch minimum into substrate, or as determined from manufacturer's fastener schedule.
2. For fastening aluminum, use stainless steel fasteners. Where fasteners will be exposed to view, use prefinished aluminum fasteners in color to match item being fastened.
3. For fastening fiber cement, use stainless-steel fasteners.

J. Insulation (EPS for EIFS): Fed Spec HH-I-524c: Density - 1.0 pound per cubic foot; R = 4.17 @ 40°F with one side grooved to provide for drainage. Groves shall be 1 inch by 1/8 inch and spaced 4 inches on center. Thickness as shown on Drawing.

K. Louvers: Hurricane louver specifically designed for high winds and impact resistance with 6 inch deep wind driven rain blades for ultimate rain resistance and internal bird screen (E6WF by Architectural Louvers). Finish to be anodized aluminum or Kynar coated aluminum as selected by Owner.

L. Paint: Waterborne 100% acrylic exterior paint recommended by siding manufacturer. Color selected by Owner. Priming is not required except at cut ends of pre-primed siding and trim boards.

M. Plywood: CDX, APA rated 48/24 treated plywood, marked PS 1, 1/2 or 3/4 inch thick as indicated.

N. Round Soffit Vents: Stamped aluminum louvered vents, 3 inches in diameter, made to be inserted into round holes cut into soffit.

1. Finish: White paint.

O. Sealant (polyurethane): ASTM C 920, Grade NS, Class 25, two (Type M) part polyurethane, non-sag, sealant (Sikaflex 2c by Sika; ChemCalk 2641 by Bostik; Dynatrol II by Pecora; Sonolastic NP2 by Sonneborn; Dymeric 240 by Tremco). (Note: a one part sealant will not be permitted!) Colors to be selected by Owner from Manufacturer's color charts with full range of stock colors.

P. Sealant (silicone): ASTM C 920, Type S, Grade NS, Class 25, one component gun-grade, low modulus silicone sealant (790, 791 and 795 by Dow Corning). Colors to be selected by Owner from Manufacturer's color charts with full range of stock colors. Provide primer recommended by Dow.

Q. Self Adhering Sheet Membrane (under metal): Self adhering membrane composed of a high strength, embossed, slip resistant polyethylene film coated on opposite side with a layer of butyl rubber adhesive, and formed into flexible sheets, 30 mils minimum thickness, designed for use under metal roofing and flashings and elevated temperatures (Ultra by W.R. Grace and Co.). Use primers, mastics and liquid membrane supplied by membrane manufacturer.

R. Siding Vent: Extruded polypropylene plastic vent recommended by siding manufacturer (SV-5 Siding Vent by Cor A Vent), ¾ inch thick by 3 inches high. Provide vents at top and bottom of wall as shown on Drawing.

S. Underlayment (for EIFS): BlueskinVP 100 Self-Adhered Water Resistive Air Barrier Membrane by Henry. Use HE574 Blueskin LVC adhesive as required by manufacturer. Do NOT use manufacturer's Blueskin WB25 Window and Door Flashing in place of specified self-adhering sheet membrane when installed in contact with, or beneath, sheet metal flashings; use the specified Ultra by Grace.

T. Vapor Barrier: Single component, fluid applied, elastomeric membrane designed to provide an air, water and vapor barrier meeting ASTM E2357 and ASTM D5590 for mold/mildew/fungus resistance (Air-Bloc 32 MR by Henry). Apply when air and substrate temperatures are 40 deg F and rising. Use Air-Bloc 16MR for application temperatures down to 20 deg F and rising. Do NOT apply either product below 20 deg F. Use self-adhered water resistive air barrier (Blueskin SA or Blueskin Butyl Flash by Henry) and primers (Blueskin Primer or #545 Aquatac) where required by vapor barrier manufacturer.

U. Wood: Grade No. 2 Southern Pine marked AWPA C2. Pressure treat with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. After treatment, kiln-dry lumber to a maximum moisture content of 19 percent. Interior (adjacent to walls) wood furring strips to generally be 2x4 inch. Exterior (outside of insulation) wood furring strips to generally be nominal 1x4 inch except at outside corners where wider furring strips are required.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of siding and related accessories.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 ROUGH CARPENTRY

A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Apply field treatment to cut surfaces of treated lumber and plywood.

C. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as required for accurate fit.

D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards. Use fasteners of appropriate type and length where not identified on Drawings. Predrill members when necessary to avoid splitting wood. Attach to substrates to support applied loading and to meet Factory Mutual Data Sheet 1-49.

E. Rip standard size wood blocking as required to fit existing openings, to form specified conditions and to provide flush surfaces to receive roofing components. Fasten blocking as indicated on Drawings and to comply with current Building Code requirements. At a minimum, fasten wood blocking to adjacent wood blocking with nails, 12 inches on center staggered. Within 8 feet of corners, fasten 6 inches on center, staggered. Stagger fasteners in nailers that exceed 5 inches in width. Secure blocking with screws where shown on Drawings. All fastening conditions must comply with Factory Mutual Data Sheet 1-49.

F. Cover wood blocking with self-adhering sheet membrane immediately after installing blocking where shown on Drawings.

G. Securely fasten all existing wood furring strips to be reused in accordance with fastening schedule shown on Drawings. This is Base Bid work. All fasteners shall be new. Existing fasteners securing furring strips shall NOT be included in the fasteners required to secure the furring strips.

H. Work Code R1WF: Replace all untreated or deteriorated 2x4 inch wood furring strips per linear foot. Fasten in accordance with the fasten schedule shown on Drawings. This work shall include removal of existing furring strips, and installation AND fastening of new furring strips.

3.4 SHEET METAL FLASHING INSTALLATION, GENERAL

A. See Section 07 6200/FLASHING AND SHEET METAL.

3.5 SELF-ADHERING SHEET MEMBRANE INSTALLATION, GENERAL

A. Apply self-adhering sheet membrane at the locations shown on the Drawings.

B. Prepare surface so substrate is clean, dry and sound. Prime (MANDATORY) substrates and install self-adhering sheet membrane. Seal all edges of self-adhering sheet membrane with liquid membrane or mastic. Provide minimum 3 foot long pieces of flashing to minimize joints. Lap seams a minimum of four inches so seams shed water and seal seams with mastic. Roll self-adhering sheet membrane with heavy hand roller (MANDATORY).

C. At ends, turn membrane up 8 inches onto vertical surfaces, forming a pan (end dam) to prevent water from flowing off ends. All corners of end dams shall be folded, not cut.

3.6 COATINGS, GENERAL

A. Mix and prepare coating/paint materials in accordance with Manufacturer's specifications and recommendations, including special conditions for the added aggregate. Keep containers, used in mixing and application of coating/paint, clean and free of foreign materials and residue. Agitate materials to produce a mixture of uniform density, and stir as required during application to maintain the uniform mixture. Never stir surface film (skin) into material. Remove film and, if necessary, strain material before using. Discard any containers where skin comprises more than 2 percent of the remaining material. Do not add thinners to the materials.

B. Install coating/paint only when temperature of surfaces to be coated and ambient air temperatures are above 40°F and rising. Do not coat/paint over dirt, rust, scale, grease, moisture, loose paint, or conditions otherwise detrimental to formation of a durable film. Apply primer and two coats of coating/paint by brush or roller in strict accordance with these specifications and the Manufacturer's recommendations, including procedures for surface preparation for previously coated surfaces and crack repairs. Apply the primer/sealer (MANDATORY) to all surfaces as soon as practicable after preparation and before subsequent surface deterioration. Apply primer and top coats evenly, free from sags, runs, crawls, holidays or defects. Apply a second coat of primer to surfaces where there is evidence of suction spots or unsealed areas after installation of the first coat of primer. Install the second primer coat to assure a finish coat with no burn-through or other defects due to insufficient sealing. Allow each coat to thoroughly dry before applying additional materials. Apply each coat to achieve

the dry film thickness per coat recommended by the coating Manufacturer. Application rates in excess of those recommended combined with fewer coats than specified will not be accepted.

C. Roller apply two top coats of coating at a rate recommended by Manufacturer to achieve coating thicknesses recommended by the Manufacturer. Application strokes should be in a fan-like or crisscross pattern to achieve uniform milage. Apply coating behind downspouts, vent flanges, and movable equipment or conduits.

3.7 PAINTING REQUIREMENTS, GENERAL

A. Mix and prepare painting materials in accordance with manufacturer's directions. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue. Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film (skin) into material. Remove film and, if necessary, strain material before using. Discard any containers where skin comprises 2 percent or more of the remaining material. Do not add thinners to the materials.

B. Apply paint only when temperature of surfaces to be painted and surrounding air temperatures are above 45°F. Do not paint over dirt, rust, scale, grease, moisture, loose paint, or conditions otherwise detrimental to formation of a durable film.

C. Apply primer to prepared surfaces as soon as practicable after preparation and before subsequent surface deterioration. Apply primer and top coats evenly, free from sags, runs, crawls, holidays or defects. Recoat primed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing. Apply primer and two coats of paint by brush or roller in strict accordance with recommendations of the paint manufacturer. Allow each coat to thoroughly dry before succeeding coat application in accordance with manufacturer's directions. For oil paints allow at least 48 hours between coats of exterior work, except where otherwise recommended by manufacturer. Apply each coat to achieve the dry film thickness per coat recommended by the coating manufacturer. Application rates in excess of those recommended combined with fewer coats than specified will not be accepted.

3.8 VAPOR BARRIER INSTALLATION

A. Install vapor barrier on concrete, CMU and plywood sheathing in accordance with manufacturer's requirements. Reinforce joints and other areas with manufacturer's self-adhering sheet membrane where required.

3.9 EXTERIOR INSULATION AND FINISH SYSTEM INSTALLATION

A. Install EIFS in accordance with the manufacturer's written installation instructions, the details and these specifications. Where installation requirements differ among the documents, notify

the Engineer of differences and install the system using the most stringent requirements as determined by the Engineer.

B. Provide and install secondary weather resistive barrier between wall substrates and new EIFS. At a minimum, this barrier shall be Blueskin by Henry.

C. Install EIFS manufacturer's recommended drainage plane above all flashings. At a minimum, install weeps spaced 24 inches on center to ensure drainage for EIFS above these openings.

D. Apply insulation over dry substrates in courses with long edges of boards oriented horizontally and mechanically fasten. Begin first course of insulation from a level base line and work upward. Stagger vertical joints of insulation boards in successive courses to produce running bond pattern. Install insulation board in patterns shown on approved Shop Drawings and as recommended by the Manufacturer. Locate joints so no piece of insulation is less than 12 inches wide or 6 inches high. Offset joints not less than 6 inches from corners of window and door openings. Interlock ends at internal and external corners. Abut insulation tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between boards. If gaps greater than 1/16 inch occur, fill with insulation cut to fit gaps exactly; insert insulation without using adhesive or other material. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes complying with details indicated. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/32 inch from surface of insulation and to remove yellowed areas due to sun exposure; do not create depressions deeper than 1/16 inch. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produce joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh. Fully back-wrap board edges before applying to wall. Cover edges of board and extend encapsulating mesh not less than 2-1/2 inches over front and back face unless otherwise indicated on Drawings. Encapsulate edges forming substrates of sealant joints within EIFS or between EIFS and other work with base coat and reinforcing mesh. Coordinate installation of flashing and insulation to produce wall assembly that does not allow water to penetrate behind flashing and water-/weather-resistive barrier.

E. Secure the insulation to the concrete and CMU walls with stainless steel screws or other fastener recommended by the manufacturer and acceptable to the Engineer. Secure the insulation using fastening pattern recommended by the fastener manufacturer.

F. Apply base coat to exposed surfaces of insulation in minimum thickness recommended in writing by EIFS manufacturer, but not less than 1/16-inch dry-coat thickness. Embed reinforcing mesh in wet base coat to produce wrinkle-free installation with mesh continuous at corners and overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer's written instructions. Do not lap reinforcing mesh within 8 inches of corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are not visible. Use combination of meshes recommended by manufacturer to achieve Ultra-High impact resistance for all EIFS within 1 floor of grade or roof line and adjacent to all walking surfaces. Where required, install heavy-duty mesh in base coat first, then install standard-impact mesh in additional base coat at 90

degrees to heavy-duty mesh. Where indicated, apply second base coat and second layer of reinforcing mesh, overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer's written instructions in same manner as first application. Do not apply until first base coat has cured.

G. Apply primer over dry base coat according to EIFS manufacturer's written instructions when required. Apply finish coat over dry base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.

H. Clean existing EIFS in accordance with Dryvit's "Cleaning and Recoating" publication (DS152) and the following, whichever is most stringent. Use general cleaning solutions designed for periodic cleaning of EIFS. Use specialized cleaners where required to remove mildew and algae. DO NOT use acidic cleaners except as approved by Dryvit for the removal of heavy efflorescence. Test the cleaning compound on a small and isolated area of the actual EIFS finish surface prior to commencing cleaning operations on a large scale. Test the prepared mixture on all surfaces that may come into contact with it during application and rinsing. Check all equipment for compatibility with the type of cleaner used. Protect people, vehicles, property and all surfaces not intended for cleaning from splash, residue, fumes, rinse and wind drift. Read the cleaning solution manufacturer's instructions for the proper dilution appropriate for the surface cleanliness/condition of the textured finish. Mix cleaning solution in accordance with the manufacturer's instructions. Cleaning effectiveness is diminished when surface and air temperature falls below 50 degrees F. Allow wall surface to warm to a temperature above 50 degrees prior to cleaning. Application of water (for detergent and rinsing applications) can be accomplished via standard hose connections or pressurized spray equipment. If pressurized spray equipment is utilized, the tip angle of the nozzle should be appropriately sized for the distance from the nozzle to the point of application. For close proximity cleaning, tip angles of 45 degrees or greater must be used to prevent damage to finish. Do not use hot or warm water. The pressurized water rinse must not be harsh enough to erode the EIFS finish. Cleaning chemicals must be compatible with pressurized spray equipment. Thoroughly wet EIFS prior to application of cleaning solution. Entire elevation of work areas should be saturated to prevent absorption and streaking. Apply cleaning solution in strict accordance with manufacturer's instructions using a low-pressure sprayer (30 to 50 psi), or through a pressurized water cleaning unit. Scrub in solution in accordance with manufacturer's instructions and as required, to prevent damage to the finish. Apply cleaning solution in continuous vertical sections extending from top of wall to bottom of wall. Strictly adhere to manufacturer's dwell time requirements prior to rinsing. Whenever possible, conduct cleaning operations on shaded portions of the building to avoid rapid evaporation. Do NOT use high pressure spray equipment to apply cleaning solutions. Rinse with large amounts of clean pressurized water, working from top to bottom, prior to drying of cleaning solution. Failure to properly rinse may leave residue which can cause re-soiling upon precipitation. Contractor will be required to re-clean areas where re-soiling occurs. Use appropriate pressures to lift surface contaminants but not damage finish. In areas exhibiting mold or algae growth or excessive efflorescence, provide cleaning solutions specifically designed for this type of staining.

I. After coating installation is complete, reattach all wall-mounted features (if any). Reinstall items matching existing fastening conditions, except substitute stainless steel fasteners for all fasteners.

3.10 INSULATION AND FURRING INSTALLATION

A. General: Comply with insulation manufacturer's instructions and recommendations for handling, installing, and anchoring insulation to substrate.

B. Install additional 2x wood furring strips spaced 16 inches on center and fasten into concrete and CMU substrates with stainless steel Tapcons spaced as shown on approved calculations and shop drawings (see Detail 8/A-7 for general guidelines). Note: Tapcon spacing will vary depending on substrate and location on building (i.e. corner zones will require additional fasteners). Use stainless steel screws for fastening furring through plywood wall sheathing into wood framing behind.

C. Remove and replace all deteriorated or untreated 2x wood furring strips indicated to be reused. Fasten as discussed above.

D. Install new fasteners for all existing 2x wood furring strips to be reused. Fasten as discussed above. Existing fasteners are to be ignored when determining new fastening requirements.

E. Provide and install vapor barrier on wall and existing 2x wood furring to remain. Over furring, install manufacturer's sheet membrane (Blueskin by Henry) and extend onto wall surface 3 inches minimum at sides.

F. Coordinate installing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

G. Install insulation with long joints of insulation in continuous straight lines with end joints staggered between rows, abutting edges and ends between boards.

H. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

I. Install insulation board between 2x furring strips mounted to wall, then cover with additional insulation board to cover first layer and furring strips. Fasten insulation board with enough fasteners with 2 inch diameter plates or recommended adhesive to hold insulation in place until furring strips can be installed.

J. Install 1x4 or 1x6 inch wood furring strips spaced 16 inches on center and fasten through insulation board into existing/new wood furring strips at the wall surface with stainless steel screws spaced as shown on approved calculations and shop drawings (see Detail 8/A-7 for general guidelines). Note: Screw spacing will vary depending on substrate and location on building (i.e. corner zones will require additional fasteners).

3.11 CEMENT BOARD SIDING INSTALLATION

A. General: Comply with siding manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

1. Do not install damaged components.
2. Center nails in elongated nailing slots without binding siding to allow for thermal movement.

B. Install fiber-cement siding and related accessories.

1. Install fasteners no more than 16 inches o.c. (at each furring strip).

C. Install fiber-cement trim at window and door openings, at inside and outside building corners, below eaves and just above grade, and at other locations shown on Drawings. Match size of existing trim, and step to match existing where grade level slopes. Seal termination of siding to trim at all locations except at head flashings.

D. Install joint sealants in accordance with manufacturers' requirements to produce a weathertight installation.

3.12 LOUVER REPLACEMENT

A. Install new louver in wall opening and fasten in accordance with louver Manufacturer's requirements, approved shop Drawings and approved fastening calculations.

3.13 FIELD QUALITY CONTROL

A. Owner may engage Engineer to observe and inspect roofing installation.

B. Remove and replace applications of siding where inspections indicate that they do not comply with specified requirements.

C. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.14 ADJUSTING AND CLEANING

A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.

B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to work of this Section.

1.2 SUMMARY

A. Section Includes:

1. Sheet metal z-flashing and counterflashings.
2. Sheet metal siding closures.
3. Sheet metal window sill flashings.
4. Sheet metal expansion joint flashing.
5. Sheet metal roof curb flashing.
6. Sheet metal flashing for flues and vent pipes.
7. Sheet metal hanging and built-in gutters.
8. Miscellaneous painting of sheet metal accessories.

B. Related Sections:

1. Section 02 4119/SELECTIVE DEMOLITION for removal and disposal of existing materials.
2. Section 07 1413/RUBBERIZED ASPHALT WATERPROOFING for installation of new foundation waterproofing.
3. Section 07 4113/MANUFACTURED ROOF PANELS for installation of new metal roofing.
4. Section 07 4600/SIDING for installation of new cement board siding.

1.3 SUBMITTALS

A. Product Data including manufacturer's material and finish data, installation instructions, and general recommendations for each specified flashing material and fabricated product.

B. Samples of the following flashing, sheet metal, and accessory items:

1. One, 8-inch-square sample of each specified sheet metal material. Also provide one painted sample of stainless steel matching the prefinished aluminum.
2. One, 12-inch-long sample of z-flashing receiver and counterflashing.
3. One, 12-inch-long section of prefinished aluminum gutter with end cap and outlet tube riveted and sealed to gutter.

4. One, 12-inch-long section of expansion joint cover and cleat for each profile.
5. One, fabricated full sized stainless steel flashing boot and rainshield.
6. Shop Drawings indicating proposed detail for each flashing condition or termination not specifically shown on the Contract Drawings. Details must be similar to details shown on Drawings and be permanently water tight without relying on sealant. Obtain Engineers approval prior to performing detail work in field.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.5 PROJECT CONDITIONS

A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes. The Drawings indicate most of the required details. Where a particular detail is not provided, provide a shop drawing and obtain the Engineer's approval for the proposed flashings detail. Solder all joints water tight, similar to those shown on Drawings. Note, all terminations shall be made watertight without relying on sealant or cement.

1.6 WARRANTY

A. Manufacturer's Warranty: Submit executed copy of Manufacturer's 20 year warranty for prefinished aluminum.

B. Contractor's Warranty: Submit an executed copy of the Contractor's written warranty covering workmanship failures for a period of 5 years. In the first 5 years, the Contractor shall repair all leaks within 24 hours of notification of leak.

PART 2 - PRODUCTS

2.1 SHEET METAL FLASHING AND TRIM MATERIALS

A. Prefinished Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability of alloy and temper designated below:

1. Aluminum Sheet: ASTM B 209, 3003-H14, with a minimum thickness of 0.032, 0.040 and 0.063 inches, unless otherwise indicated
2. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2. Color and gloss as selected by Owner from manufacturer's full range of choices for color and gloss.

B. Stainless Steel: Type 304, ASTM A 167, stainless steel; 0.018, 0.024 and 0.032 inches thick as shown on Drawings.

2.2 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Backer Rod: Closed cell polyethylene foam rod or rope, 25 percent greater in diameter than joint width to be sealed. Joint widths vary. Different sizes will be required.

B. Batt Insulation: ASTM C 665, Type III, Class A fiberglass insulation.

C. Bituminous Coating: SSPC - Paint 12, solvent-type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.

D. Fasteners: Same metal as flashing/sheet metal or other non-corrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened. Galvanized steel fasteners are not acceptable for exposed applications.

E. Hardware Cloth: Stainless steel hardware cloth, 1/2 inch by 1/2 inch, minimum wire diameter 0.030 inches.

F. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, non-drying, nonmigrating sealant.

G. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.

H. Nails: Stainless steel common nails, length to penetrate substrate a minimum of 1 1/4 inches.

I. Paint System (for stainless steel): Primer and top coat recommended by stainless steel manufacturer. Apply primer and 2 coats of paint in accordance with Manufacturer's recommendations. Color to match adjacent prefinished sheet metal.

J. Paper Slip Sheet: 5-lb. rosin-sized building paper.

K. Plywood: CDX, APA rated 48/24 treated plywood, marked PS 1, 1/2 or 3/4 inch thick as indicated.

L. Polyethylene Underlayment: Minimum 6-mil carbonated polyethylene film resistant to decay when tested in accordance with ASTM E 154.

M. Roofing Cement: ASTM D 4586, Type I, non-asbestos roofing cement, asphalt, wet and dry.

N. Self Adhering Sheet Membrane (under metal): Self adhering membrane composed of a high strength, embossed, slip resistant polyethylene film coated on opposite side with a layer of butyl rubber adhesive, and formed into flexible sheets, 30 mils minimum thickness, designed for use under metal roofing and flashings and elevated temperatures (Ultra by W.R. Grace and Co.). Use primers, mastics and liquid membrane supplied by membrane manufacturer.

O. Screws (stainless steel): ASTM A 478, Type 304 stainless steel, pan or truss head, with neoprene washers, No. 8 x 1/2 inch for fastening metal to metal, No. 10 x 1 1/2 inches for fastening metal to wood.

P. Screws (self-tapping): ASTM A 478, Type 18/8 stainless steel, pan or truss head self-tapping screws, with neoprene washers; No. 10 x 1/2 inch for fastening sheet metal and No. 12 x 2 1/2 inch or length and diameter as required for fastening wood products to steel members.

Q. Sealant (polyurethane): ASTM C 920, Grade NS, Class 25, two (Type M) part polyurethane, non-sag, sealant (Sikaflex 2c by Sika; ChemCalk 2641 by Bostik; Dynatrol II by Pecora; Sonolastic NP2 by Sonneborn; Dymeric 240 by Tremco). (Note: a one part sealant will not be permitted!) Colors to be selected by Owner from Manufacturer's color charts with full range of stock colors.

R. Sealant (silicone): ASTM C 920, Type S, Grade NS, Class 25, one component gun-grade, low modulus silicone sealant (790, 791 and 795 by Dow Corning). Colors to be selected by Owner from Manufacturer's color charts with full range of stock colors. Provide primer recommended by Dow

S. Solder: Provide 50 - 50 tin/lead solder (ASTM B 32), with rosin flux.

T. Wood: Grade No. 2 Southern Pine marked AWPA C2. Pressure treat with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. After treatment, kiln-dry lumber to a maximum moisture content of 19 percent. Wood furring strips to generally be nominal 1x4 inch except at outside corners where wider furring strips are required.

2.3 SHEET METAL FABRICATION

A. General Metal Fabrication: Field verify dimensions and shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual", 7th edition, 2012, and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and

recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

B. Provide 4-inch-wide flanges for setting on built-up roofing membrane with concealment by composition stripping.

C. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder. Rivet joints for additional strength where required.

D. Expansion Provisions: At locations where specific information for metal expansion joints is not specified, provide drive cleat expansion joint or alternate permanently watertight expansion joint approved by the Engineer. Spacing between expansion joints shall be a maximum of 30 feet. At bends in metal flanges to receive drive cleat, solder fill pieces watertight at corners.

E. Sealant Joints: Where movable, nonexpansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.

F. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

G. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.

H. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.

1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

I. Fabricate penetration sleeves with minimum 10-inch-high stack, of diameter 1 inch larger than penetrating element.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 ROUGH CARPENTRY

A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Apply field treatment to cut surfaces of treated lumber and plywood.

C. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as required for accurate fit.

D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards. Use fasteners of appropriate type and length where not identified on Drawings. Predrill members when necessary to avoid splitting wood. Attach to substrates to support applied loading and to meet Factory Mutual Data Sheet 1-49.

E. Rip standard size wood blocking as required to fit existing openings, to form specified conditions and to provide flush surfaces to receive roofing components. Fasten blocking as indicated on Drawings and to comply with current Building Code requirements. At a minimum, fasten wood blocking to adjacent wood blocking with nails, 12 inches on center staggered. Within 8 feet of corners, fasten 6 inches on center, staggered. Stagger fasteners in nailers that exceed 5 inches in width. Secure blocking with screws where shown on Drawings. All fastening conditions must comply with Factory Mutual Data Sheet 1-49.

F. Install new curbs so that top of base flashing will be 10 inches above roofing surfaces. Where new wood curbs exceed 11 inches in height, Contractor may substitute wood stud walls with plywood faces for solid wood curbs shown on Drawings.

G. Cover wood blocking with self-adhering sheet membrane immediately after installing blocking where shown on Drawings.

3.3 INSTALLATION

A. General: Except as otherwise indicated, comply with Manufacturer's installation instructions and recommendations and with SMACNA "Architectural Sheet Metal Manual." Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.

B. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Underlayment: Where metal is to be installed directly on cementitious or wood substrates, install self-adhering sheet membrane as shown on Drawings.

D. Priming: Prime metal surfaces and allow primer to dry before contacting metal with asphaltic materials.

E. Metal flanges: Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.

F. Roof-Edge Flashings: Secure metal flashings at roof edges according to FM Loss Prevention Data Sheet 1-49.

G. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

H. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches, except where pretinned surface would show in finished Work.

1. Do not solder prefinished aluminum sheet.
2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

I. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.

1. Use joint adhesive for nonmoving joints specified not to be soldered.

J. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.

K. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.

1. Underlayment: Where installing stainless steel or aluminum directly on cementitious or wood substrates, install a slip sheet of red-rosin paper and a course of polyethylene underlayment.
2. Bed flanges of Work in a thick coat of roofing cement where required for waterproof performance.

L. See Section 07 4113/MANUFACTURED ROOF PANELS for sheet metal flashing integral with metal roofing. Sheet metal flashings to be provided by the roofing panel manufacturer include: ridge flashing, valley flashing, pitch break flashing, drip edge flashing, gable flashing, headwall flashing and rake flashing.

M. See Section 07 4600/SIDING for sheet metal flashing integral with cement board siding. Provide head flashings from 0.032 inch prefinished aluminum as recommended by siding manufacturer. At window and door heads, provide flashings in one continuous piece, without joints and strip into vapor barrier where installation permits.

N. Z-Flashing: Install 0.032 inch prefinished aluminum z-flashing with 4 inch vertical leg on substrate as shown on Drawings. Fasten vertical leg to wall with stainless steel nails (wood), screws (metal) or nailins (masonry) spaced 16 inches on center. Lap and seal all joints, then cover joints with 8 inch wide strip of self-adhering sheet membrane and a 12 inch cover plate. Strip vertical leg to wall with self-adhering sheet membrane. Provide fully sealed end dams w here z-flashing terminates.

O. Counterflashing: Install 0.032 inch prefinished aluminum counterflashing where shown on Drawing. Fasten to receivers and curb cap flashings with stainless steel screws with neoprene washers, 24 inches on center. Nail top of flashings to wood substrates with stainless steel nails spaced 24 inches on center. Lap sections 4 inches minimum.

P. Siding Vent Closure: Fabricate vent closures for top and bottom of siding walls from 0.032 inch prefinished aluminum. Fabricate closures to maintain 3/4 inch clear vent opening as shown on Drawing. Fasten closures with stainless steel nails spaced 16 inches on center.

Q. Window Sill Flashing: Fabricate window sill flashings from 0.018 inch stainless steel and 0.032 inch prefinished aluminum as shown on Drawing. Where concealed with new cement board trim, install outer flashing from prefinished aluminum; hook over cleat and fasten top with stainless steel nails spaced 16 inches on center. Then install stainless steel flashing extended from under window system, lapping over prefinished outer piece. Solder all joints in stainless steel watertight. Turn stainless steel flashing up 4 inches at jambs (end dams) and turn out 4 inches onto wall outside of window opening. Strip joint between stainless steel flashing and outer prefinished aluminum flashing with 4 inch wide strip of self-adhering sheet membrane. Where flashing will be exposed at low storefront windows shown on Drawings, fabricate entirely of 0.040 inch prefinished aluminum with riveted and sealed joints.

R. Expansion Joint Curbs: Install wood nailers as shown on Drawing. Install vapor barrier then rubber expansion joint assembly. Secure expansion joint with stainless steel termination bars at both sides and strip in with additional vapor barrier or sheet membrane as shown on Drawings. Install metal roofing. Fabricate and install 0.032 inch prefinished aluminum cover to profile shown with bend at field piece off-center to match break at wall expansion joint. At building walls, turn cover up wall and fasten to masonry with stainless steel nails spaced 16 inches on center, and cover with counterflashing.

For cover, lap all joints to shed water, and seal. Cover joints with 8 inch wide strip of self-adhering sheet membrane and a 12 inch cover plate.

All terminations shall be made watertight without relying on sealant. Where a particular detail is not provided, provide a shop drawing and obtain the Engineer's approval for the proposed flashings detail.

S. Mechanical Units on Roof: Flash mechanical curbs with 0.018 inch stainless steel boots with integral upslope cricket and separate counterflashing as shown on Drawing. Solder all joints watertight. Extend boot flashing upslope 12 inches. Extend boot downslope 12 inches, and overlap downslope metal panels. Where units interrupt standing seams downslope of units, fabricate boots to extend up and over seams as shown on Drawing and NRCA standard details. Extend boot flashing to each side and turn up into first uninterrupted standing seams. Seal boot flashing to metal panels with two beads of sealant, including in and on standing seams. Install stainless steel counterflashing to unit to cover top termination of boot flashing, and fasten with stainless steel screws with neoprene washers spaced 24 inches on center (2 per side minimum).

T. Flues Through Roof: Flash round penetrations with 0.018 inch stainless steel boots and separate rain shields as shown on Drawing. Solder all joints watertight. Extend boot flashing upslope 12 inches. Extend boot downslope 12 inches, and overlap downslope metal panels. Where flues interrupt standing seams downslope of flues, fabricate boots to extend up and over seams as shown on Drawing and NRCA standard details. Extend boot flashing to each side and turn up into first uninterrupted standing seams. Seal boot flashing to metal panels with two beads of sealant, including in and on standing seams. Install sealant tape and rain shield lapping boot a minimum of 3 inches and secure with a stainless steel band clamp. Seal top edge of rain shield with urethane sealant. Where in-service temperatures exceed 240 deg F, seal rain shield with silicone sealant.

U. Vent Pipes Through Roof: Ensure vent pipes are located between standing seams of new roofing system. Flash all vent pipes with 0.018 inch stainless steel flashing boots and separate lead caps as shown on the Drawings. Solder all joints watertight. Extend boot flashing upslope 12 inches. Extend boot downslope 12 inches, fasten with stainless steel screw and use as cleat for overlying metal panel. Extend boot flashing to each side and turn up into standing seams. Install new lead cap lapping boot a minimum of 2 inches and turning down into vent pipe a minimum one inch as shown on the Drawings. Cap diameter shall not be more than one inch greater than the pipe diameter. Flange of flashing boot shall be covered by new roofing panels; cover vertical exposed stainless steel boot and cap with prefinished aluminum cover, riveted to cap flashing.

V. Gutters - hanging: Fabricate 5 inch wide by 6 inch deep gutter from 0.032 inch prefinished aluminum as shown on Drawing. Lap joints 1 inch, rivet 2 inches on center and seal with sealant. Rivet and seal end caps watertight to gutter. Provide 2 inch wide gutter straps/spacers 36 inches on center. Rivet straps/spacers to front lip and top back edge of gutter. Install gutter in brackets spaced 36 inches on center, alternating with straps. Cover brackets with 0.032 inch thick prefinished aluminum sheet to completely conceal stainless steel. Fabricate 4 inch long gutter outlet tube with riveted and sealed joint. Set outlet tube in sealant and fasten to bottom of gutter with rivets. Fabricate 3 inch by 4 inch downspout with seamed joint at concealed side. Lap outlet tube 2 inches and secure with 3 stainless steel screws.

Secure downspouts to wall with prefinished aluminum straps spaced 8 feet on center maximum. Provide storm drain boot at grade and tie into storm drain line below grade. Provide transition pieces as required to discharge downspouts into storm drain boots.

W. Gutters - built-in: Fabricate built-in gutter liner from 0.018 inch stainless steel. Solder all joints watertight except provide gutter expansion joints 50 feet on center in accordance with SMACNA. Secure outside edge with 0.024 inch stainless steel continuous cleat fastened with stainless steel nails spaced 6 inches on center. For new roofing, extend 4 inch roof flange upslope and secure with stainless steel nails spaced 12 inches on center. For existing roofing, lock back of gutter with existing eave flashing. Fabricate 6 inch (minimum) long gutter outlet tube with riveted and soldered joint. Rivet and solder watertight outlet tube to bottom of gutter. Extend outlet tube into existing drain line.

X. Painting: Remove all rust, dirt, cement and other materials incompatible with painting system, in accordance with paint Manufacturer's specifications and recommendations, from all stainless steel surfaces to be painted (as directed by Engineer). Apply primer and two coats of paint to prepared surface in accordance with paint Manufacturer's specifications and recommendations.

3.4 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION